AMENDMENTS TO THE CLAIMS

The following is a complete, marked up listing of revised claims with a status identifier in parentheses, underlined text indicating insertions, and strikethrough and/or double brackets indicating deletions.

Listing of the Claims

1. (CURRENTLY AMENDED) A method of etching a silicon nitride film comprising:

forming a buffer layer of silicon dioxide on a semiconductor substrate;

forming a silicon nitride film on the buffer layer;

heating the semiconductor substrate to a process temperature of at least about 40 °C; ~~and~~

etching the silicon nitride film using a plasma generated from an etching gas including CH_2F_2, while maintaining the semiconductor substrate at the process temperature; and

wherein the etching gas has an etching selectivity of above about five between the silicon nitride film and the buffer layer at the process temperature.

2. (ORIGINAL) The method of etching a silicon nitride film according to claim 1, wherein:

the etching gas further includes CF_4.

3. (ORIGINAL) The method of etching a silicon nitride film according to claim 1, wherein:

the etching gas further includes argon.

4. (ORIGINAL) The method of etching a silicon nitride film according to claim 1, wherein:

the etching gas further includes O_2.

5. (ORIGINAL) The method of etching a silicon nitride film according to claim 1, wherein:

the etching gas includes a mixture of CH_2F_2, Ar and one gas selected from a group consisting of CF_4 and O_2; and further wherein;

the plasma etches silicon nitride at a first etch rate;

the plasma etches silicon dioxide at a second etch rate; and

a ratio of the first etch rate to the second etch rate is at least 5:1.

6. (ORIGINAL) The method of etching a silicon nitride film according to claim 1, wherein:

the process temperature is between about 60 and about 100 °C.

7. (ORIGINAL) The method of etching a silicon nitride film according to claim 1, wherein:

etching the silicon nitride film includes:

loading the semiconductor substrate on which the silicon nitride film has been formed onto a supporting plate within an etching chamber;

heating the semiconductor substrate to the process temperature by heat transfer from the supporting plate; and

introducing the etching gas into the etching chamber and applying RF power to the etching gas to form the plasma within the etching chamber.

8. (CURRENTLY AMENDED) A method of manufacturing a semiconductor device comprising:

forming a gate insulation film on a semiconductor substrate;

forming a gate structure having a gate electrode and a gate mask on the gate insulation film;

forming a first buffer layer including silicon oxide on the gate structure and on the semiconductor substrate;

forming a silicon nitride film on the first buffer layer;

heating the semiconductor substrate to a first processing temperature of at least about 40°C;

forming a first plasma from a first etching gas including CH_2F_2; ~~and~~

etching the silicon nitride film using the first plasma to form a gate spacer along a sidewall of the gate structure while maintaining the semiconductor substrate at the first process temperature; and

wherein the first etching gas has an etching selectivity of above about five between the silicon nitride film and the first buffer layer at the first process temperature.

9. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 8, wherein:

the first etching gas further includes CF_4.

10. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 8, wherein:

the first etching gas further includes argon.

11. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 8, wherein:

the first etching gas further includes O_2.

12. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 8, wherein:

the first etching gas includes a mixture of CH_2F_2, Ar and one gas selected from a group consisting of CF_4 and O_2; and further wherein;

the first plasma etches silicon nitride at a first etch rate;

the first plasma etches silicon dioxide at a second etch rate; and

a ratio of the first etch rate to the second etch rate is at least 5:1.

13. (CURRENTLY AMENDED) The method of manufacturing a semiconductor device according to claim 8, further comprising:

forming a second buffer layer on the gate structure, the gate spacer and the semiconductor substrate, the second buffer layer including silicon oxide;

forming an etch stop layer on the second buffer layer, the etch stop layer including silicon nitride;

forming an interlayer insulation film on the etch stop layer;

removing the interlayer insulation film from a contact hole region, thereby exposing a region of the etch stop layer;

heating the semiconductor substrate to a second process temperature of at least about 40 °C;

removing the exposed region of the etch stop layer with a second plasma generated from a second etching gas that includes CH_2F_2 while maintaining the semiconductor substrate

at the second process temperature thereby exposing a region of the second buffer layer; ~~and~~

wherein the second etching gas has an etching selectivity of above about five between the etch stop layer and the second buffer layer at the second process temperature; and

removing the exposed portion of the second buffer layer to expose a region of the semiconductor substrate and form a contact opening.

14. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 13, wherein:

the second etching gas includes a mixture of CH_2F_2, Ar and one gas selected from a group consisting of CF_4 and O_2; and further wherein;

the second plasma etches silicon nitride at a third etch rate;

the second plasma etches silicon dioxide at a fourth etch rate; and

a ratio of the third etch rate to the fourth etch rate is at least 5:1.

15. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 14, wherein:

the first etching gas and the second etching gas include substantially the same mixture of CH_2F_2, Ar and one gas selected from a group consisting of CF_4 and O_2.

16. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 14, wherein:

at least one of the first process temperature and the second process temperature is at least about 60 °C.

17. (ORIGINAL) The method of manufacturing a semiconductor device according to claim 14, wherein:

both the first process temperature and the second process temperature are at least about 60 °C.

18. (ORIGINAL) A method of manufacturing a semiconductor device comprising:

forming a gate insulation film on a semiconductor substrate;

forming a gate structure having a gate electrode and a gate mask on the gate insulation film;

forming a first buffer layer including silicon oxide on the gate structure and on the semiconductor substrate;

forming a silicon nitride film on the first buffer layer;

etching the silicon nitride using an etch method according to claim 1 to form a gate spacer along a sidewall of the gate structure;

forming a second buffer layer on the gate structure, the gate spacer and the semiconductor substrate, the second buffer layer including silicon oxide;

forming an etch stop layer on the second buffer layer, the etch stop layer including silicon nitride;

forming an interlayer insulation film on the etch stop layer;

removing the interlayer insulation film from a contact hole region, thereby exposing a region of the etch stop layer;

etching the exposed region of the etch stop layer using an etch method according to claim 1 to expose a region of the second buffer layer; and

removing the exposed portion of the second buffer layer to expose a region of the semiconductor substrate and form a contact opening.